

## **AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

### **Listing of Claims:**

1. (Currently Amended)      A process for preparing metal salt nanoparticles in a liquid phase reaction, comprising mixing ~~components~~ **starting materials** of the nanoparticles in a synthesis mixture and growing the nanoparticles **from said synthesis mixture** during a synthesis period, said process further comprising adding a modifying reagent to the synthesis mixture within the synthesis period, with the modifying reagent exhibiting a first functional group for coupling to ~~the nanoparticle~~ **one of said nanoparticles** and a second functional group for binding to ~~further molecules~~ **a molecule other than said nanoparticles**.
  
2. (Currently Amended)      The process as claimed in claim 1, wherein the metal salt nanoparticles are substances which are selected from the group consisting of the halides, the alkaline earth metal sulfates, the phosphates and halophosphates, the borates, the vanadates, the aluminates, the silicates, the tungstates, the molybdates and the germanates, all of which ~~can also, in addition, be~~ **are undoped or are** doped with one or more elements of the lanthanides and/or Mn, Ag, Cu, Pb, Bi, Cr, Sn or Sb.

3. (Currently Amended) The process as claimed in claim 1, wherein the metal salt nanoparticles are substances selected from the group consisting of:

- a)  $XY_2$  ( $X = \text{Mg, Ca, Sr, Ba}$ ;  $Y = \text{F, Cl, I}$ ),  $\text{CaF}_2:\text{Eu(II)}$ ,  $\text{BaF}_2:\text{Eu}$ ;  
 $\text{BaMgF}_4:\text{Eu}$ ;  $\text{LiBaF}_3:\text{Eu}$ ;  $\text{SrF}_2:\text{Eu}$ ;  $\text{SrBaF}_2\text{Eu}$ ;  $\text{CaBr}_2:\text{Eu-SiO}_2$ ;  $\text{CaCl}_2\text{Eu}$ ;  
 $\text{CaCl}_2:\text{Eu-SiO}_2$ ;  $\text{CaCl}_2:\text{Eu,Mn-SiO}_2$ ;  $\text{CaI}_2:\text{Eu}$ ;  $\text{CaI}_2\text{Eu,Mn}$ ;  $\text{KMgF}_3:\text{Eu}$ ;  
 $\text{SrF}_2:\text{Eu(II)}$ ,  $\text{BaF}_2:\text{Eu(II)}$ ,  $\text{YF}_3$ ,  $\text{NaYF}_4$ ,
- b)  $\text{XSO}_4$  ( $X = \text{Mg, Ca, Sr, Ba}$ ),  $\text{SrSO}_4:\text{Eu}$ ,  $\text{SrSO}_4:\text{Eu,Mn}$ ,  $\text{BaSO}_4:\text{Eu}$ ,  
 $\text{BaSO}_4:\text{Eu,Mn}$ ,  $\text{CaSO}_4$ ,  $\text{CaSO}_4:\text{Eu}$ ,  $\text{CaSO}_4:\text{Eu,Mn}$ , and also in each case  
mixed alkaline earth metal sulfates, optionally in combination with  
magnesium,
- c)  $\text{CaPO}_4:\text{Ce,Mn}$ ,  $\text{Ca}_5(\text{PO}_4)_3\text{Cl}:\text{Ce,Mn}$ ,  $\text{Ca}_5(\text{PO}_4)_3\text{F}:\text{Ce,Mn}$ ,  $\text{SrPO}_4:\text{Ce,Mn}$ ,  
 $\text{Sr}_5(\text{PO}_4)_3\text{Cl}:\text{Ce,Mn}$ ,  $\text{Sr}_5(\text{PO}_4)_3\text{F}:\text{Ce,Mn}$ , this also codoped with  $\text{Eu(II)}$  and  
 $\text{Eu,Mn}$ ,  $\alpha\text{-Ca}_3(\text{PO}_4)_2:\text{Eu}$ ;  $\beta\text{-Ca}_3(\text{PO}_4)_2:\text{Eu,Mn}$ ;  $\text{Ca}_5(\text{PO}_4)_3\text{Cl}:\text{Eu}$ ;  
 $\text{Sr}_5(\text{PO}_4)_3\text{Cl}:\text{Eu}$ ;  $\text{Ba}_{10}(\text{PO}_4)_6\text{Cl}:\text{Eu}$ ;  $\text{Ba}_{10}(\text{PO}_4)_6\text{Cl}:\text{Eu,Mn}$ ,  
 $\text{Ca}_2\text{Ba}_2(\text{PO}_4)_3\text{Cl}:\text{Eu}$ ;  $\text{Ca}_5(\text{PO}_4)_3\text{F}:\text{Eu}^{2+}\text{X}^{3+}$ ;  $\text{Sr}_5(\text{PO}_4)_3\text{F}:\text{Eu}^{2+}\text{X}^{3+}$  ( $X = \text{Nd, Er,}$   
 $\text{Ho, Tb}$ );  $\text{Ba}_5(\text{PO}_4)_3\text{Cl}:\text{Eu}$ ;  $\beta\text{-Ca}_3(\text{PO}_4)_2:\text{Eu}$ ;  $\text{CaB}_2\text{P}_2\text{O}_9:\text{Eu}$ ;  $\text{CaB}_2\text{P}_2\text{O}_9:\text{Eu}$ ;  
 $\text{Ca}_2\text{P}_2\text{O}_7:\text{Eu}$ ;  $\text{Ca}_2\text{P}_2\text{O}_7:\text{Eu,Mn}$ ;  $\text{Sr}_{10}(\text{PO}_4)_6\text{Cl}_2:\text{Eu}$ ; ( $\text{Sr, Ca, Ba,}$   
 $\text{Mg}$ ) $_{10}(\text{PO}_4)_6\text{Cl}_2:\text{Eu}$ ;  $\text{LaPO}_4:\text{Ce}$ ;  $\text{CePO}_4$ ,
- d)  $\text{LaBO}_3$ ;  $\text{LaBO}_3:\text{Ce}$ ;  $\text{ScBO}_3:\text{Ce}$   $\text{YAlBO}_3:\text{Ce}$ ;  $\text{YBO}_3:\text{Ce}$ ;  $\text{Ca}_2\text{B}_5\text{O}_9\text{Cl}:\text{Eu}$ ;  
 $x\text{EuOyNa}_2\text{OzB}_2\text{O}_3$ ,

- e)  $\text{YVO}_4$ ,  $\text{YVO}_4\text{:Eu}$ ,  $\text{YVO}_4\text{:Dy}$ ,  $\text{YVO}_4\text{:Sm}$ ,  $\text{YVO}_4\text{:Bi}$ ;  $\text{YVO}_4\text{:Bi,Eu}$ ,  
 $\text{YVO}_4\text{:Bi,Dy}$ ,  $\text{YVO}_4\text{:Bi,Sm}$ ,  $\text{YVO}_4\text{:Tm}$ ,  $\text{YVO}_4\text{:Bi,Tm}$ ,  $\text{GdVO}_4$ ,  
 $\text{GdVO}_4\text{:Eu}$ ,  $\text{GdVO}_4\text{:Dy}$ ,  $\text{GdVO}_4\text{:Sm}$ ,  $\text{GdVO}_4\text{:Bi}$ ;  $\text{GdVO}_4\text{:Bi,Eu}$ ,  
 $\text{GdVO}_4\text{:Bi,Dy}$ ,  $\text{GdVO}_4\text{:Bi,Sm}$ ,
- f)  $\text{MgAl}_2\text{O}_4\text{:Eu}$ ;  $\text{CaAl}_2\text{O}_4\text{:Eu}$ ;  $\text{SrAl}_2\text{O}_4\text{:Eu}$ ;  $\text{BaAl}_2\text{O}_4\text{:Eu}$ ;  $\text{LaMgAl}_{11}\text{O}_{19}\text{:Eu}$ ;  
 $\text{BaMgAl}_{10}\text{O}_{17}\text{:Eu}$ ;  $\text{BaMgAl}_{10}\text{O}_{17}\text{:Eu, Mn}$ ;  $\text{CaAl}_{12}\text{O}_{19}\text{:Eu}$ ;  $\text{SrAl}_{12}\text{O}_{19}\text{:Eu}$ ;  
 $\text{SrMgAl}_{10}\text{O}_{17}\text{:Eu}$ ;  $\text{Ba}(\text{Al}_2\text{O}_3)_6\text{:Eu}$ ;  $(\text{Ba,Sr})\text{MgAl}_{10}\text{O}_{17}\text{:Eu, Mn}$ ;  
 $\text{CaAl}_2\text{O}_4\text{:Eu,Nd}$ ;  $\text{SrAl}_2\text{O}_4\text{:Eu, Dy}$ ;  $\text{Sr}_4\text{Al}_{14}\text{O}_{25}\text{:Eu,Dy}$ ,
- g)  $\text{BaSrMgSi}_2\text{O}_7\text{:Eu}$ ;  $\text{Ba}_2\text{MgSiO}_7\text{:Eu}$ ;  $\text{BaMg}_2\text{Si}_2\text{O}_7\text{:Eu}$ ;  $\text{CaMgSi}_2\text{O}_6\text{:Eu}$ ;  
 $\text{SrBaSiO}_4\text{:Eu}$ ;  $\text{Sr}_2\text{Si}_3\text{O}_8\text{:SrCl}_2\text{:Eu}$ ;  $\text{Ba}_5\text{SiO}_4\text{Br}_6\text{:Eu}$ ;  $\text{Ba}_5\text{SiO}_4\text{Cl}_6\text{:Eu}$ ;  
 $\text{Ca}_2\text{MgSi}_2\text{O}_7\text{:Eu}$ ;  $\text{CaAl}_2\text{Si}_2\text{O}_8\text{:Eu}$ ;  $\text{Ca}_{1.5}\text{Sr}_{0.5}\text{MgSi}_2\text{O}_7\text{:Eu}$ ;  
 $(\text{Ca,Sr})_2\text{MgSi}_2\text{O}_7\text{:Eu}$ ,  $\text{Sr}_2\text{LiSiO}_4\text{F:E u}$ ,
- h)  $\text{X}_3\text{WO}_6$  ( $\text{X} = \text{Mg, Ca, Sr, Ba}$ ),  $\text{X}_2\text{WO}_4$  ( $\text{X} = \text{Li, Na, K, Rb, Cs}$ ),  $\text{XMoO}_4$  ( $\text{X} = \text{Mg, Ca, Sr, Ba}$ ) and also polymolybdates or polytungstates and/or the salts of the corresponding hetero- or isopoly acids,
- i)  $\text{Zn}_2\text{GeO}_4$ ,
- j) the following compounds:  $\text{ALnO}_2\text{:Yb, Er}$  ( $\text{A} = \text{Li, Na}$ ;  $\text{Ln} = \text{Gd, Y, Lu}$ );  
 $\text{Ln}_2\text{O}_3\text{:Yb, Er}$  ( $\text{Ln} = \text{La, Gd, Y, Lu}$ );  $\text{LnAO}_4\text{:Yb, Er}$  ( $\text{Ln} = \text{La, Y}$ ;  $\text{A} = \text{P, V, As, Nb}$ );  $\text{Ca}_3\text{Al}_2\text{Ge}_3\text{O}_{12}\text{:Er}$ ;  $\text{Gd}_2\text{O}_2\text{S:Yb, Er}$ ;  $\text{La}_2\text{S:Yb,Er}$ ,

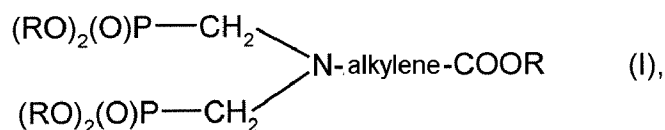
all of which ~~can also, in addition, be~~ **are undoped or** doped with one or more elements of the lanthanides and/or Mn, Ag, Cu, Pb, Bi, Cr, Sn or Sb within host lattice.

4. (Previously Presented) The process as claimed in claim 2, wherein doping elements are present in the host lattice at a concentration between  $10^{-5}$  mol% and 50 mol%.

5. (Canceled)

6. (Previously Presented) The process as claimed in claim 1, wherein the modifying reagent exhibits a growth-controlling function in order to selectively control both the growth of the nanoparticles and the functionality of the surface, by means of binding to the nanoparticle surface.

7. (Previously Presented) The process as claimed in claim 1, wherein use is made, as modifying reagent, of a pentaalkyl iminobis(methylenephosphono)carboxylate of the formula I:



where

R is a C<sub>1</sub>-C<sub>4</sub>-alkyl radical, and

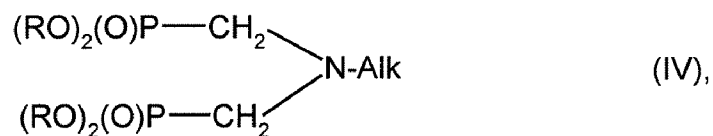
alkylene is a C<sub>1</sub>-C<sub>22</sub>-alkylene radical or C<sub>7</sub>-C<sub>20</sub>-alkylenearylene radical, which can be linear or branched and can, in addition, carry, as additional substituents, halogen atoms, COOR groups, alkoxy groups, bis(dialkoxylphosphorylmethyl)amino groups or aryl radicals.

8. (Previously Presented) The process as claimed in claim 1, wherein use is made, as modifying reagent, of a pentaethyl or a pentaisopropyl iminobis-(methylenephosphono) undecanoate.

9. (Previously Presented) The process as claimed in claim 1, wherein use is made, as modifying reagent, of a pentaethyl or pentaisopropyl iminobis(methylene-phosphono)caproate.

10. (Previously Presented) The process as claimed in claim 1, wherein the time which elapses during the synthesis period before the modifying reagent is added is directly proportional to a planned average size of the nanoparticles.

11. (Previously Presented) Method of using of compounds of the formula IV as modifying reagent for preparing metal salt nanoparticles in accordance with the process as claimed in claim 1:



where

R has the meaning given above with regard to formula (I), and

Alk is a C<sub>4</sub>-C<sub>22</sub>-alkyl radical or C<sub>7</sub>-C<sub>30</sub> aralkyl or arylalkyl radical.

12. (Previously Presented) Method of using the nanoparticles which are prepared as claimed in claim 1 for coupling to biologically relevant molecules for the purpose of marking them.

13. (Previously Presented) Method of using the nanoparticles which are prepared as claimed in claim 1 for a subsequent intended application which requires the nanoparticles to be coupled to application-specific molecules, with the coupling

being selectively promoted or made possible by means of one of the functional properties of the modifying reagent.

14. (Currently Amended) The process as claimed in claim 2, wherein doping elements are present in the host lattice ~~a~~ **at** a concentration between 0.01 mol% and 30 mol%.
15. (Previously Presented) The process as claimed in claim 2, wherein doping elements are present in the host lattice at a concentration between 0.1 mol% and 20 mol%.
16. (Previously Presented) The process as claimed in claim 1, wherein the modifying reagent exhibits a third functional group.
17. (Previously Presented) The process as claimed in claim 1, wherein the functional groups are esters, carbonyl, carboxyl or amino groups.